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Date: October 19, 2006 /Jessica Sexton/
Jessica Sexton

# IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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| In re patent application of: | | | |
| Applicant(s): | Venkata N. Padmanabhan, *et al.* | Examiner: | Ashokkumar B. Patel |
| Serial No: | 09/849,662 | Art Unit: | 2154 |
| Filing Date: | May 4, 2001 | | |

Title: SYSTEM AND METHOD FOR DETERMINING THE GEOGRAPHIC LOCATION OF INTERNET HOSTS

**Mail Stop Appeal Brief-Patents**
**Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, VA 22313-1450**

## APPEAL BRIEF

Dear Sir:

Appellants' representative submits this brief in connection with an appeal of the above-identified patent application. Payment is being submitted via credit card in connection with all fees due regarding this appeal brief. In the event any additional fees may be due and/or are not covered by the credit card, the Commissioner is authorized to charge such fees to Deposit Account No. 50-1063 [MSFTP189USA].

**I. Real Party in Interest (37 C.F.R. §41.37(c)(1)(i))**

The real party in interest in the present appeal is Microsoft Corporation, the assignee of the present application.

**II. Related Appeals and Interferences (37 C.F.R. §41.37(c)(1)(ii))**

Appellant, appellant's legal representative, and/or the assignee of the present application are not aware of any appeals or interferences which may be related to, will directly affect, or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**III. Status of Claims (37 C.F.R. §41.37(c)(1)(iii))**

Claims 1-41 stand rejected by the Examiner. The rejection of claims 1-41 is being appealed.

**IV. Status of Amendments (37 C.F.R. §41.37(c)(1)(iv))**

No amendments were made after the Final Office Action dated June 9, 2006.

**V. Summary of Claimed Subject Matter (37 C.F.R. §41.37(c)(1)(v))**

**A. Independent Claim 1**

Independent claim 1 recites a computer implemented method of determining the location of an Internet host using a computer system, comprising the following computer executable acts: obtaining route information relating to a network path between a host IP address associated with the Internet host and the computer system, wherein the network path comprises the computer system, the Internet host, and at least one intermediate network node, and wherein the route information comprises a plurality of router labels associated with the host IP address and the at least one intermediate network node; extracting a location code from the route information corresponding to a router label associated with one of the Internet host and an intermediate network node proximate the Internet host; consulting a data store comprising at least one data set having location codes and corresponding location information; obtaining location information from the data store corresponding to the location code associated with the one of the Internet host and the intermediate network node proximate the Internet host; providing a location estimate of the location of the Internet host according to the location information from the data store

corresponding to the location code; determining a delay time associated with a transmission from the computer system to receipt of the transmission at the Internet host along the network path; and selectively correcting the location estimate according to the delay time associated with the network path. (*See e.g.*, page 12, line 26 – page 13, line 24)

**B. Independent Claim 7**

Independent claim 7 recites a software tool for determining the location of an Internet host using a computer system, comprising the following computer executable components: a route trace component adapted to obtain route information relating to a network path between a host IP address associated with the Internet host and the computer system, wherein the first network path comprises the computer system, the Internet host, and at least one intermediate network node, and wherein the route information comprises a plurality of router labels associated with the host IP address and the at least one intermediate network node; an extraction component adapted to extract a location code from the route information corresponding to a router label associated with one of the Internet host and an intermediate network node proximate the Internet host; a data store comprising at least one data set having location codes and corresponding location information; an estimation component adapted to obtain location information from the data store corresponding to the location code associated with the one of the Internet host and the intermediate network node proximate the Internet host, and to provide a location estimate of the location of the Internet host according to the location information from the data store corresponding to the location code; a correction component to determine a delay time associated with a transmission from the computer system to receipt of the transmission at the Internet host along the network path and selectively correct the location estimate according to the delay time associated with the network path. (*See e.g.*, page 12, line 26 – page 13, line 24)

**C. Independent Claim 8**

Independent claim 8 recites a computer-readable medium having computer-executable instructions for: obtaining route information relating to a network path between a host IP address associated with an Internet host and a computer system, wherein the network path comprises the computer system, the Internet host, and at least one intermediate network node, and wherein the route information comprises a plurality of router labels associated with the host IP address and

the at least one intermediate network node; extracting a location code from the route information corresponding to a router label associated with one of the Internet host and an intermediate network node proximate the Internet host; consulting a data store comprising at least one data set having location codes and corresponding location information; obtaining location information from the data store corresponding to the location code associated with the one of the Internet host and the intermediate network node proximate the Internet host; providing a location estimate of the location of the Internet host according to the location information from the data store corresponding to the location code; determining a delay time associated with a transmission from the computer system to receipt of the transmission at the Internet host along the network path; and selectively correcting the location estimate according to the delay time associated with the network path. (*See e.g.*, page 12, line 26 – page 13, line 24)

**D. Independent Claim 9**

Independent claim 9 recites a computer implemented system for determining the location of an Internet host, comprising the following computer executable components: a first component operating in a computer system to obtain route information relating to a network path between a host IP address associated with the Internet host and the computer system, wherein the first network path comprises the computer system, the Internet host, and at least one intermediate network node, and wherein the route information comprises a plurality of router labels associated with the host IP address and the at least one intermediate network node; a second component operating in the computer system to extract a location code from the route information corresponding to a router label associated with one of the Internet host and an intermediate network node proximate the Internet host; a third component operating in the computer system to consult a data store comprising at least one data set having location codes and corresponding location information; a fourth component operating in the computer system to obtain location information from the data store corresponding to the location code associated with the one of the Internet host and the intermediate network node proximate the Internet host; a fifth component operating in the computer system to provide a location estimate of the location of the Internet host according to the location information from the data store corresponding to the location code; and a sixth component operating in the computer system to determine a delay time associated with a transmission from the computer system to receipt of the transmission at the Internet host

along the network path and selectively correct the location estimate according to the delay time associated with the network path. (*See e.g.*, page 12, line 26 – page 13, line 24)

**E. Independent Claim 10**

Independent claim 10 recites geographical location estimate data associated with an Internet host, the estimate data resulting from a process executing on a computer system, comprising the following computer executable acts: obtaining route information relating to a network path between a host IP address associated with the Internet host and a computer system, wherein the network path comprises the computer system, the Internet host, and at least one intermediate network node, and wherein the route information comprises a plurality of router labels associated with the host IP address and the at least one intermediate network node; extracting a location code from the route information corresponding to a router label associated with one of the Internet host and an intermediate network node proximate the Internet host; consulting a data store comprising at least one data set having location codes and corresponding location information; obtaining location information from the data store corresponding to the location code associated with the one of the Internet host and the intermediate network node proximate the Internet host; and providing a location estimate of the location of the Internet host according to the location information from the data store corresponding to the location code; determining a delay time associated with a transmission from the computer system to receipt of the transmission at the Internet host along the network path; and selectively correcting the location estimate according to the delay time associated with the network path. (*See e.g.*, page 12, line 26 – page 13, line 24)

**F. Independent Claim 11**

Independent claim 11 recites a computer implemented method of determining the location of an Internet host using multiple computer systems, comprising the following computer executable acts: obtaining route information relating to a plurality of network paths between a host IP address associated with the Internet host and a corresponding plurality of computer systems, respectively, wherein the plurality of network paths individually comprise a corresponding computer system, the Internet host, and at least one intermediate network node, and wherein the route information comprises a plurality of router labels associated with the host

IP address and an intermediate network node; extracting a location code from the route information corresponding to a router label associated with one of the Internet host and an intermediate network node proximate the Internet host; consulting a data store comprising at least one data set having location codes and corresponding location information; obtaining location information from the data store corresponding to the location code associated with the one of the Internet host and the intermediate network node proximate the Internet host; providing a location estimate of the location of the Internet host according to the location information; determining a delay time associated with a transmission from the computer system to receipt of the transmission at the Internet host along at least one of the network paths; and selectively correcting the location estimate according to the delay time. (*See e.g.*, page 12, line 26 – page 13, line 24)

**G. Independent Claim 12**

Independent claim 12 recites a computer implemented method of determining the location of an Internet host using a first computer system, comprising the following computer executable acts: measuring a first delay time relating to a transmission from the first computer system to receipt of the transmission at the Internet host along a first network path between a host IP address associated with the Internet host and the first computer system; measuring a second delay time relating to a transmission from a second computer system to receipt of the transmission at the Internet host along a second network path between the host IP address and the second computer system; measuring a third delay time relating to a transmission from a third computer system to receipt of the transmission at the Internet host along a third network path between the host IP address and the third computer system, at least one of the first, second, and third network paths containing at least one intermediate node; correlating the first, second, and third delay times; and providing a location estimate of the location of the Internet host according to the correlation of the first, second, and third delay times. (*See e.g.*, page 11, lines 24-27; page 18, line 26 – page 19, line 21)

**H. Independent Claim 23**

Independent claim 23 recites a software tool for determining the location of an Internet host using a first computer system, comprising the following computer executable components: a

first delay component adapted to measure a first delay time relating to a transmission from the first computer system to receipt of the transmission at the Internet host along a first network path between a host IP address associated with the Internet host and the first computer system; a second delay component adapted to measure a second delay time relating to a transmission from a second computer system to receipt of the transmission at the Internet host along a second network path between the host IP address and the second computer system; a third delay component adapted to measure a third delay time relating to a transmission from a third computer system to receipt of the transmission at the Internet host along a third network path between the host IP address and the third computer system, at least one of the first, second, and third network paths containing at least one intermediate node; a correlation component adapted to correlate the first, second, and third delay times; and an estimation component adapted to provide a location estimate of the location of the Internet host according to the correlation of the first, second, and third delay times. (*See e.g.*, page 11, lines 24-27; page 18, line 26 – page 19, line 21)

**I. Independent Claim 24**

Independent claim 24 recites a computer-readable medium having computer-executable instructions for: measuring a first delay time relating to a transmission from a first computer system to receipt of the transmission at an Internet host along a first network path between a host IP address associated with the Internet host and the first computer system; measuring a second delay time relating to a transmission from a second computer system to receipt of the transmission at the Internet host along a second network path between the host IP address and the second computer system; measuring a third delay time relating to a transmission from the Internet host to receipt of the transmission at a third computer system along a third network path between the host IP address associated with the Internet host and a third computer system, at least one of the first, second, and third network paths containing at least one intermediate node; correlating the first, second, and third delay times; and providing a location estimate of the location of the Internet host according to the correlation of the first, second, and third delay times. (*See e.g.*, page 11, lines 24-27; page 18, line 26 – page 19, line 21)

**J. Independent Claim 25**

Independent claim 25 recites a computer implemented system for determining the location of an Internet host, comprising the following computer executable components: a first component operating in a first computer system to measure a first delay time relating to a transmission from the first computer system to receipt of the transmission at the Internet host along a first network path between a host IP address associated with the Internet host and the first computer system; a second component operating to measure a second delay time relating to a transmission from a second computer system to receipt of the transmission at the Internet host along a second network path between the host IP address and the second computer system; a third component operating to measure a third delay time relating to a transmission from a third computer system to receipt of the transmission at the Internet host along a third network path between the host IP address and the third computer system, at least one of the first, second, and third network paths containing at least one intermediate node; a fourth component operating to correlate the first, second, and third delay times; and a fifth component operating in a first computer system to provide a location estimate of the location of the Internet host according to the correlation of the first, second, and third delay times. (*See e.g.*, page 11, lines 24-27; page 18, line 26 – page 19, line 21)

**K. Independent Claim 26**

Independent claim 26 recites geographical location estimate data associated with an Internet host, the estimate data resulting from a process executing on a computer system, comprising the following computer executable acts: measuring a first delay time relating to a transmission from a first computer system to receipt of the transmission at the Internet host along a first network path between a host IP address associated with the Internet host and the first computer system; measuring a second delay time relating to a transmission from a second computer system to receipt of the transmission at the Internet host along a second network path between the host IP address and the second computer system; measuring a third delay time relating to a transmission from a third computer system to receipt of the transmission at the Internet host along a third network path between the host IP address and the third computer system, at least one of the first, second, and third network paths containing at least one intermediate node; correlating the first, second, and third delay times; and providing a location

estimate of the location of the Internet host according to the correlation of the first, second, and third delay times. (*See e.g.*, page 11, lines 24-27; page 18, line 26 – page 19, line 21)

**L. Independent Claim 27**

Independent claim 27 recites a method of determining the location of an Internet host using a first computer system, comprising the following computer executable acts: obtaining partial IP-to-location mapping information from a data source; obtaining network routing information; clustering together IP addresses corresponding to hosts in the same geographic location according to network routing information to obtain cluster information; correlating the partial IP-to-location information with the cluster information providing a location estimate of the location of the Internet host according to the correlation of the partial IP-to-location information and the cluster information; and computing a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host. (*See e.g.*, page 24, lines 15-22; page 24, lines 1-2)

**M. Independent Claim 38**

Independent claim 38 recites a software tool for determining the location of an Internet host using a first computer system, comprising the following computer executable components: a first component adapted to obtain partial IP-to-location mapping information from a data source; a routing protocol component adapted to obtain network routing information; a clustering component adapted to cluster together IP addresses corresponding to hosts in the same geographic location according to network routing information to obtain cluster information; a correlation component adapted to correlate the partial IP-to-location information with the cluster information; an estimation component adapted to provide a location estimate of the location of the Internet host according to the correlation of the partial IP-to-location information and the cluster information; and a correction component to compute a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host and selectively providing the location estimate. (*See e.g.*, page 24, lines 15-22; page 24, lines 1-2; page 29, line 25 – page 30, line 5)

**N. Independent Claim 39**

Independent claim 39 recites a computer-readable medium having computer-executable instructions for: obtaining partial IP-to-location mapping information from a data source; obtaining network routing information; clustering together IP addresses corresponding to hosts in the same geographic location according to network routing information to obtain cluster information; correlating the partial IP-to-location information with the cluster information; providing a location estimate of the location of the Internet host according to the correlation of the partial IP-to-location information and the cluster information; and calculating a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host and selectively providing the location estimate. (*See e.g.*, page 24, lines 15-22; page 24, lines 1-2; page 29, line 25 – page 30, line 5)

**O. Independent Claim 40**

Independent claim 40 recites a computer implemented system for determining the location of an Internet host, comprising the following computer executable components: a first component operating to obtain partial IP-to-location mapping information from a data source; a second component operating to obtain network routing information; a third component operating to cluster together IP addresses corresponding to hosts in the same geographic location according to network routing information to obtain cluster information; a fourth component operating to correlate the partial IP-to-location information with the cluster information; a fifth component operating to provide a location estimate of the location of the Internet host according to the correlation of the partial IP-to-location information and the cluster information; and a sixth component operating to calculate a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host and selectively providing the location estimate. (*See e.g.*, page 24, lines 15-22; page 24, lines 1-2; page 29, line 25 – page 30, line 5)

**P. Independent Claim 41**

Independent claim 41 recites geographical location estimate data associated with an Internet host, the estimate data resulting from a process executing on a computer system, comprising the following computer executable acts: obtaining partial IP-to-location mapping information from a data source; obtaining network routing information; clustering together IP

addresses corresponding to hosts in the same geographic location according to network routing information to obtain cluster information; correlating the partial IP-to-location information with the cluster information; providing a location estimate of the location of the Internet host according to the correlation of the partial IP-to-location information and the cluster information; and computing a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host and selectively providing the location estimate. (*See e.g.*, page 24, lines 15-22; page 24, lines 1-2; page 29, line 25 – page 30, line 5)

**VI. Grounds of Rejection to be Reviewed (37 C.F.R. §41.37(c)(1)(vi))**

**A.** Whether claims 1-11 are unpatentable under 35 U.S.C. §102(e) over Anderson *et al.* (U.S. 6,684,250).

**B.** Whether claims 12-26 are unpatentable under 35 U.S.C. §102(e) over Anderson *et al.* (U.S. 6,684,250).

**C.** Whether claims 27-37 are unpatentable under 35 U.S.C. §102(e) over Anderson *et al.* (U.S. 6,684,250).

**D.** Whether claims 38-41 are unpatentable under 35 U.S.C. §102(e) over Anderson *et al.* (U.S. 6,684,250).

**VII. Argument (37 C.F.R. §41.37(c)(1)(vii))**

**A. Rejection of Claims 1-11 Under 35 U.S.C. §102(e)**

Claims 1-11 stand rejected under 35 U.S.C. §102(e) as being anticipated by Anderson *et al.* (US Patent 6,684,250). It is respectfully submitted that this rejection should be reversed for at least the following reasons. Anderson *et al.* does not teach each and every element of appellants' invention as recited in the subject claims.

> A single prior art reference anticipates a patent claim only if it expressly or inherently describes each and every limitation set forth in the patent claim. *Trintec Industries, Inc., v. Top-U.S.A. Corp.*, 295 F.3d 1292, 63 U.S.P.Q.2D 1597 (Fed. Cir. 2002); *See Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631,

> 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987). **The identical invention must be shown in as complete detail as is contained in the … claim.** *Richardson v. Suzuki Motor Co*., 868 F.2d 1226, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

The subject invention relates to determining the geographic location of Internet hosts. The location of an Internet host is determined by way of a data store and location codes extracted from router labels associated with nodes along the path from a computer system to the Internet host. The location may be selectively corrected, for example, if a time delay of a transmission from a computer to the internet host is greater than a threshold indicating that the Internet host and intermediate node are not geographically close. In particular, independent claim 1 (and similarly recited in independent claims 7-11) recites *a network path between a host IP address associated with the Internet host and the computer system, wherein the network path comprises the computer system, the Internet host, and* ***at least one intermediate network node****…determining* ***a delay time associated with*** *a transmission from the computer system to receipt of the transmission at the Internet host along* ***the network path; and selectively correcting the location estimate according to the delay time associated with the network path***.

Anderson *et al.* does not teach or suggest the aforementioned novel aspects of appellants' invention as recited in the subject claims. The cited art primarily employs host location information stored with databases along with partial and full string analysis, traceroute information, and number of hops in traceroutes to estimate the location of a host. However, contrary to assertions in the Office Action, Anderson *et al.* fails to teach transmission time delay measurements from the host to a computer system to correct location estimates. The section of the cited art referenced in the Office Action points to a single sentence where Anderson *et al.* makes a casual reference to latency calculations. Anderson *et al.* provides no further details as to what these latency calculations are and how they are used anywhere in the specification or drawings. Specifically, there is no mention or suggestion of a transmission time delay measurement from the host to a computer system along *a network path that includes at least one intermediate node*. Moreover, Anderson *et al.* is silent regarding employing this delay time to selectively correct the location estimate. The Office Action in the Response to Arguments section cites a segment of the prior art that discusses tiered geographic location estimation. This section merely discloses that the several possible methods of location estimation may be

employed such that each method will be employed successively until a method does not fail. Appellants' claimed invention produces an initial location estimate and then selectively corrects this estimate based upon the transmission delay time measurement along the network path. The cited art does not disclose this selective correction mechanism. Therefore, it is clear that Anderson *et al.* fails to teach or suggest determining a delay time associated with a transmission from the computer system to receipt of the transmission at the Internet host along the network path that includes at least one intermediate host; and selectively correcting the location estimate according to the delay time associated with the network path.

In view of at least the foregoing, appellants' representative respectfully submits that Anderson *et al.* fails to teach or suggest all elements of appellants' invention as recited in independent claims 1, 7-11 (and claims 2-6 that depend there from), and thus fails to anticipate the claimed invention. Therefore, this rejection should be reversed.

**B. Rejection of Claims 12-26 Under 35 U.S.C. §102(e)**

Claims 12-26 stand rejected under 35 U.S.C. §102(e) as being anticipated by Anderson *et al.* (US Patent 6,684,250). It is respectfully submitted that this rejection should be reversed for at least the following reasons. Anderson *et al.* does not teach each and every element of appellants' invention as recited in the subject claims.

Independent claim 12 (and similarly independent claims 23-26) recites *measuring a first delay time relating to a transmission from the first computer system to receipt of the transmission at the Internet host along a first network path between a host IP address associated with the Internet host and the first computer system; measuring a second delay time ... a second network path between the host IP address and the second computer system; measuring a third delay time ...along a third network path between the host IP address and the third computer system,* ***at least one of the first, second, and third network paths containing at least one intermediate node****; correlating the first, second, and third delay times; and providing a location estimate of the location of the Internet host according to the correlation of the first, second, and third delay times*. As discussed above, Anderson *et al.* makes a casual reference to latency calculations without providing any details as to what the latency calculations are based upon and how they are used. Specifically, the cited art is silent regarding measuring a delay time relating to a transmission from the computer system to receipt of the transmission at the Internet host

along a network path *that includes at least one intermediate host.* Furthermore, Anderson *et al.* is also silent regarding determining three delay times and correlating the three delay times to provide a location estimate.

Accordingly, appellants' representative respectfully submits that Anderson *et al.* fails to teach or suggest all elements of appellants' invention as recited in independent claims 12, 23-26 (and claims 13-22 that depend there from), and thus fails to anticipate the claimed invention. Therefore, this rejection should be reversed.

**C. Rejection of Claims 27-37 Under 35 U.S.C. §102(e)**

Claims 27-37 stand rejected under 35 U.S.C. §102(e) as being anticipated by Anderson *et al.* (US Patent 6,684,250). It is respectfully submitted that this rejection should be reversed for at least the following reasons. Anderson *et al.* does not teach each and every element of appellants' invention as recited in the subject claims.

Independent claim 27 recites *clustering together IP addresses corresponding to hosts in the same geographic location according to network routing information to obtain cluster information;* ***… computing a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host***. Contrary to assertions in the Office Action, Anderson *et al.* also fails to teach or suggest this aspect. Appellants' claimed invention can compute a dispersion metric of the statistical variability of locations represented by the cluster of IP addresses to represent the accuracy of the location estimate of the host. The section of Anderson *et al.* cited in the Office Action refers to an algorithm that locates the upper and lower bounds of a range of IP addresses within a block of IP addresses that share some common information. This algorithm computes upper and lower bounds, not a dispersion metric. A dispersion metric is a measure of statistical variability of members of a population. Accordingly, Anderson *et al.* fails to teach or suggest computing a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host. The sections of prior art cited in the Office Action Response to Arguments section makes a general statement regarding metrics and statistical methodologies and providing a set of associated probabilities that indicate the accuracy of the location. This section describes a probability estimate of the accuracy of the location, not a dispersion metric describing the variability of members of a population. Anderson *et al* is silent regarding a dispersion metric. Therefore, the cited art fails to teach or

suggest computing a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host.

For at least the reasons discussed above, appellants' representative respectfully submits that Anderson *et al.* fails to teach or suggest all elements of appellants' invention as recited in independent claims 27 (and claims 28-37 that depend there from), and thus fails to anticipate the claimed invention. Accordingly, this rejection should be reversed.

**D. Rejection of Claims 38-41 Under 35 U.S.C. §102(e)**

Claims 38-41 stand rejected under 35 U.S.C. §102(e) as being anticipated by Anderson *et al.* (US Patent 6,684,250). It is respectfully submitted that this rejection should be reversed for at least the following reasons. Anderson *et al.* does not teach each and every element of appellants' invention as recited in the subject claims.

Independent claim 38 (and similarly independent claims 39-41) recites *a clustering component adapted to cluster together IP addresses corresponding to hosts in the same geographic location according to network routing information to obtain cluster information; ... and* ***a correction component to compute a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host and selectively providing the location estimate***. As discussed above with respect to the similar limitations of independent claim 27, Anderson *et al.* also fails to teach or suggest correction component to compute a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host. Moreover, the subject claims disclose selectively providing the location estimate. Appellants' claimed invention can determine whether a location estimate should be provided based upon the accuracy of the estimate, for example exceeding a threshold. Therefore, the cited art fails to teach or suggest a correction component to compute a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host and selectively providing the location estimate.

In view of at least the foregoing, appellants' representative respectfully submits that Anderson *et al.* fails to teach or suggest all elements of appellants' invention as recited in independent claims 38-41 and thus fails to anticipate the claimed invention. Therefore, this rejection should be reversed.

## CONCLUSION

The present application is believed to be in condition for allowance in view of the above comments and amendments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [MSFTP189USA].

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact appellants' undersigned representative at the telephone number below.

Respectfully submitted,

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## VIII. Claims Appendix (37 C.F.R. §41.37(c)(1)(viii))

1. A computer implemented method of determining the location of an Internet host using a computer system, comprising the following computer executable acts:

obtaining route information relating to a network path between a host IP address associated with the Internet host and the computer system, wherein the network path comprises the computer system, the Internet host, and at least one intermediate network node, and wherein the route information comprises a plurality of router labels associated with the host IP address and the at least one intermediate network node;

extracting a location code from the route information corresponding to a router label associated with one of the Internet host and an intermediate network node proximate the Internet host;

consulting a data store comprising at least one data set having location codes and corresponding location information;

obtaining location information from the data store corresponding to the location code associated with the one of the Internet host and the intermediate network node proximate the Internet host;

providing a location estimate of the location of the Internet host according to the location information from the data store corresponding to the location code;

determining a delay time associated with a transmission from the computer system to receipt of the transmission at the Internet host along the network path; and

selectively correcting the location estimate according to the delay time associated with the network path.

2. The method of claim 1, further comprising extracting the location code by examining the router labels in route order along the path from the host to the computer system until a location code is found that is usable to obtain location information from the data store.

3. The method of claim 2, further comprising:

determining a confidence metric representative of the accuracy of the location estimate; and

selectively providing the location estimate of the location of the Internet host if the confidence metric exceeds a threshold.

4. The method of claim 3, further comprising:

determining a confidence metric representative of the accuracy of the location estimate based upon the delay time between the Internet host and the network node associated with the location estimate.

5. The method of claim 1, further comprising:

obtaining route information relating to each network path between the host IP address and each of a plurality of computer systems, wherein the route information comprises a plurality of router labels associated with the host IP address, and each of the plurality of computer systems, and at least one intermediate network node in each network path;

extracting a location code for each network path from the route information corresponding to a router label associated with one of the Internet host and the at least one intermediate network node in each network path;

obtaining location information from the data store corresponding to each location code;

providing a plurality of location estimates of the location of the Internet host according to the location information from the data store corresponding to each location code; and

correlating at least two of the location estimates to provide an improved location estimate of the location of the Internet host.

6. The method of claim 1, wherein the location code comprises one of a city code, and airport code, and a country code, and wherein obtaining the route information comprises using a traceroute tool.

7. A software tool for determining the location of an Internet host using a computer system, comprising the following computer executable components:

a route trace component adapted to obtain route information relating to a network path between a host IP address associated with the Internet host and the computer system, wherein the first network path comprises the computer system, the Internet host, and at least one intermediate network node, and wherein the route information comprises a plurality of router labels associated with the host IP address and the at least one intermediate network node;

an extraction component adapted to extract a location code from the route information corresponding to a router label associated with one of the Internet host and an intermediate network node proximate the Internet host;

a data store comprising at least one data set having location codes and corresponding location information;

an estimation component adapted to obtain location information from the data store corresponding to the location code associated with the one of the Internet host and the intermediate network node proximate the Internet host, and to provide a location estimate of the location of the Internet host according to the location information from the data store corresponding to the location code;.

a correction component to determine a delay time associated with a transmission from the computer system to receipt of the transmission at the Internet host along the network path and selectively correct the location estimate according to the delay time associated with the network path.

8. A computer-readable medium having computer-executable instructions for:

obtaining route information relating to a network path between a host IP address associated with an Internet host and a computer system, wherein the network path comprises the computer system, the Internet host, and at least one intermediate network node, and wherein the route information comprises a plurality of router labels associated with the host IP address and the at least one intermediate network node;

extracting a location code from the route information corresponding to a router label associated with one of the Internet host and an intermediate network node proximate the Internet host;

consulting a data store comprising at least one data set having location codes and corresponding location information;

obtaining location information from the data store corresponding to the location code associated with the one of the Internet host and the intermediate network node proximate the Internet host;

providing a location estimate of the location of the Internet host according to the location information from the data store corresponding to the location code;

determining a delay time associated with a transmission from the computer system to receipt of the transmission at the Internet host along the network path; and

selectively correcting the location estimate according to the delay time associated with the network path.

9. A computer implemented system for determining the location of an Internet host, comprising the following computer executable components:

a first component operating in a computer system to obtain route information relating to a network path between a host IP address associated with the Internet host and the computer system, wherein the first network path comprises the computer system, the Internet host, and at least one intermediate network node, and wherein the route information comprises a plurality of router labels associated with the host IP address and the at least one intermediate network node;

a second component operating in the computer system to extract a location code from the route information corresponding to a router label associated with one of the Internet host and an intermediate network node proximate the Internet host;

a third component operating in the computer system to consult a data store comprising at least one data set having location codes and corresponding location information;

a fourth component operating in the computer system to obtain location information from the data store corresponding to the location code associated with the one of the Internet host and the intermediate network node proximate the Internet host;

a fifth component operating in the computer system to provide a location estimate of the location of the Internet host according to the location information from the data store corresponding to the location code; and

a sixth component operating in the computer system to determine a delay time associated with a transmission from the computer system to receipt of the transmission at the Internet host along the network path and selectively correct the location estimate according to the delay time associated with the network path.

10. Geographical location estimate data associated with an Internet host, the estimate data resulting from a process executing on a computer system, comprising the following computer executable acts:

obtaining route information relating to a network path between a host IP address associated with the Internet host and a computer system, wherein the network path comprises the computer system, the Internet host, and at least one intermediate network node, and wherein the route information comprises a plurality of router labels associated with the host IP address and the at least one intermediate network node;

extracting a location code from the route information corresponding to a router label associated with one of the Internet host and an intermediate network node proximate the Internet host;

consulting a data store comprising at least one data set having location codes and corresponding location information;

obtaining location information from the data store corresponding to the location code associated with the one of the Internet host and the intermediate network node proximate the Internet host; and

providing a location estimate of the location of the Internet host according to the location information from the data store corresponding to the location code;

determining a delay time associated with a transmission from the computer system to receipt of the transmission at the Internet host along the network path; and

selectively correcting the location estimate according to the delay time associated with the network path.

11. A computer implemented method of determining the location of an Internet host using multiple computer systems, comprising the following computer executable acts:

obtaining route information relating to a plurality of network paths between a host IP address associated with the Internet host and a corresponding plurality of computer systems, respectively, wherein the plurality of network paths individually comprise a corresponding computer system, the Internet host, and at least one intermediate network node, and wherein the route information comprises a plurality of router labels associated with the host IP address and an intermediate network node;

extracting a location code from the route information corresponding to a router label associated with one of the Internet host and an intermediate network node proximate the Internet host;

consulting a data store comprising at least one data set having location codes and corresponding location information;

obtaining location information from the data store corresponding to the location code associated with the one of the Internet host and the intermediate network node proximate the Internet host;

providing a location estimate of the location of the Internet host according to the location information.

determining a delay time associated with a transmission from the computer system to receipt of the transmission at the Internet host along at least one of the network paths; and

selectively correcting the location estimate according to the delay time.

12. A computer implemented method of determining the location of an Internet host using a first computer system, comprising the following computer executable acts:

measuring a first delay time relating to a transmission from the first computer system to receipt of the transmission at the Internet host along a first network path between a host IP address associated with the Internet host and the first computer system;

measuring a second delay time relating to a transmission from a second computer system to receipt of the transmission at the Internet host along a second network path between the host IP address and the second computer system;

measuring a third delay time relating to a transmission from a third computer system to receipt of the transmission at the Internet host along a third network path between the host IP address and the third computer system, at least one of the first, second, and third network paths containing at least one intermediate node;

correlating the first, second, and third delay times; and

providing a location estimate of the location of the Internet host according to the correlation of the first, second, and third delay times.

13. The method of claim 12, wherein correlating the first, second, and third delay times comprises triangulating the first, second, and third delay measurements.

14. The method of claim 12, wherein correlating the first, second, and third delay times comprises:

consulting a data store comprising N sets of first, second, and third delay measurements between the first, second, and third computer systems, respectively, and N known hosts, as well as location information associated with the N known hosts, wherein N is an integer;

performing a comparison of the first, second, and third delay times with the N sets of first, second, and third delay measurements in the data store;

determining a nearest set of first, second, and third delay measurements according to the comparison; and

providing a location estimate of the Internet host according to the nearest set of first, second, and third delay measurements.

15. The method of claim 14, wherein performing the comparison of the first, second, and third delay times with the N sets of first, second, and third delay measurements in the data store comprises determining N Euclidian distances corresponding to the Euclidian distances between the N sets of first, second, and third delay measurements in the data store and the first, second, and third delay times, and wherein providing a location estimate of the Internet host according to the nearest set of first, second, and third delay measurements comprises selecting location information associated with the set of first, second, and third delay measurements in the data store associated with the smallest Euclidian distance as the location estimate.

16. The method of claim 12,

wherein correlating the first, second, and third delay times comprises:

computing a first probability density function establishing a relationship between a first network delay associated with the first computer system and a first distance from the first computer system;

determining a first distance estimate representative of the distance between the first computer system and the location of the Internet host using the first delay time and the first probability density function;

computing a second probability density function establishing a relationship between a second network delay associated with the second computer system and a second distance from the second computer system;

determining a second distance estimate representative of the distance between the second computer system and the location of the Internet host using the second delay time and the second probability density function;

computing a third probability density function establishing a relationship between a third network delay associated with the third computer system and a third distance from the third computer system; and

determining a third distance estimate representative of the distance between the third computer system and the location of the Internet host using the third delay time and the third probability density function;

and wherein providing the location estimate comprises triangulating the first, second, and third distance estimates.

17. The method of claim 16, wherein determining the first, second, and third distance estimates further comprises computing an error function over a location space, and determining coordinates within the location space where the error function is minimized.

18. The method of claim 17, wherein determining coordinates within the location space where the error function is minimized comprises minimizing the error function across a list of known city locations, and wherein providing the location estimate comprises providing the known city location corresponding with the minimum value of the error function.

19. The method of claim 18, wherein computing the error function comprises using a weighted least mean squares algorithm to optimize the location estimate.

20. The method of claim 18, wherein computing the error function comprises using a probability density estimation to optimize the location estimate.

21. The method of claim 18, wherein computing the error function comprises using a weighted least mean squares algorithm to prune a solution space, and using a probability density estimation to optimize the location estimate from the pruned solution space.

22. The method of claim 18, wherein computing the error function comprises using a probability density estimation to prune a solution space, and using a weighted least mean squares algorithm to optimize the location estimate from the pruned solution space.

23. A software tool for determining the location of an Internet host using a first computer system, comprising the following computer executable components:

a first delay component adapted to measure a first delay time relating to a transmission from the first computer system to receipt of the transmission at the Internet host along a first network path between a host IP address associated with the Internet host and the first computer system;

a second delay component adapted to measure a second delay time relating to a transmission from a second computer system to receipt of the transmission at the Internet host along a second network path between the host IP address and the second computer system;

a third delay component adapted to measure a third delay time relating to a transmission from a third computer system to receipt of the transmission at the Internet host along a third network path between the host IP address and the third computer system, at least one of the first, second, and third network paths containing at least one intermediate node;

a correlation component adapted to correlate the first, second, and third delay times; and

an estimation component adapted to provide a location estimate of the location of the Internet host according to the correlation of the first, second, and third delay times.

24. A computer-readable medium having computer-executable instructions for:

measuring a first delay time relating to a transmission from a first computer system to receipt of the transmission at an Internet host along a first network path between a host IP address associated with the Internet host and the first computer system;

measuring a second delay time relating to a transmission from a second computer system to receipt of the transmission at the Internet host along a second network path between the host IP address and the second computer system;

measuring a third delay time relating to a transmission from the Internet host to receipt of the transmission at a third computer system along a third network path between the host IP address associated with the Internet host and a third computer system, at least one of the first, second, and third network paths containing at least one intermediate node;

correlating the first, second, and third delay times; and

providing a location estimate of the location of the Internet host according to the correlation of the first, second, and third delay times.

25. A computer implemented system for determining the location of an Internet host, comprising the following computer executable components:

a first component operating in a first computer system to measure a first delay time relating to a transmission from the first computer system to receipt of the transmission at the Internet host along a first network path between a host IP address associated with the Internet host and the first computer system;

a second component operating to measure a second delay time relating to a transmission from a second computer system to receipt of the transmission at the Internet host along a second network path between the host IP address and the second computer system;

a third component operating to measure a third delay time relating to a transmission from a third computer system to receipt of the transmission at the Internet host along a third network path between the host IP address and the third computer system, at least one of the first, second, and third network paths containing at least one intermediate node;

a fourth component operating to correlate the first, second, and third delay times; and

a fifth component operating in a first computer system to provide a location estimate of the location of the Internet host according to the correlation of the first, second, and third delay times.

26. Geographical location estimate data associated with an Internet host, the estimate data resulting from a process executing on a computer system, comprising the following computer executable acts:

measuring a first delay time relating to a transmission from a first computer system to receipt of the transmission at the Internet host along a first network path between a host IP address associated with the Internet host and the first computer system;

measuring a second delay time relating to a transmission from a second computer system to receipt of the transmission at the Internet host along a second network path between the host IP address and the second computer system;

measuring a third delay time relating to a transmission from a third computer system to receipt of the transmission at the Internet host along a third network path between the host IP address and the third computer system, at least one of the first, second, and third network paths containing at least one intermediate node;

correlating the first, second, and third delay times; and

providing a location estimate of the location of the Internet host according to the correlation of the first, second, and third delay times.

27. A method of determining the location of an Internet host using a first computer system, comprising the following computer executable acts:

obtaining partial IP-to-location mapping information from a data source;

obtaining network routing information;

clustering together IP addresses corresponding to hosts in the same geographic location according to network routing information to obtain cluster information;

correlating the partial IP-to-location information with the cluster information

providing a location estimate of the location of the Internet host according to the correlation of the partial IP-to-location information and the cluster information; and

computing a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host.

28. The method of claim 27, wherein obtaining network routing information comprises using a routing protocol.

29. The method of claim 28, wherein the routing protocol is one of BGP, RIP, OSPF, IGRP, and EGP.

30. The method of claim 27, wherein clustering together IP addresses corresponding to hosts in the same geographic location according to network routing information to obtain cluster information comprises associating an address prefix used by a routing protocol with a geographical location.

31. The method of claim 30, further comprising:

sub-dividing the geographical location associated with the address prefix into at least two clusters according to a geographical spread associated with the geographical location.

32. The method of claim 27, further comprising sub-dividing the cluster information according to a geographical spread associated with the geographical location.

33. The method of claim 27, further comprising selectively providing the location estimate if the dispersion metric is less than a threshold value.

34. The method of claim 33, further comprising a threshold value that is dependent on the size of the cluster.

35. The method of claim 27, further comprising:

obtaining route information relating to a first network path between a host IP address associated with the Internet host and the first computer system, wherein the first network path comprises the first computer system, the Internet host, and at least one intermediate network node, and wherein the route information comprises a plurality of router labels associated with the host IP address and the at least one intermediate network node;

extracting a first location code from the route information corresponding to a router label associated with one of the Internet host and an intermediate network node proximate the Internet host;

consulting a data store comprising at least one data set having location codes and corresponding location information;

obtaining first location information from the data store corresponding to the first location code associated with the one of the Internet host and the intermediate network node proximate the Internet host; and

providing a first location estimate of the location of the Internet host according to the first location information from the data store corresponding to the first location code.

36. The method of claim 35, further comprising:

measuring a first delay time relating to a transmission from the first computer system to receipt of the transmission at the Internet host along a first network path between a host IP address associated with the Internet host and the first computer system;

measuring a second delay time relating to a transmission from a second computer system to receipt of the transmission at the Internet host along a second network path between the host IP address and the second computer system;

measuring a third delay time relating to a transmission from a third computer system to receipt of the transmission at the Internet host along a third network path between the host IP address and the third computer system, at least one of the first, second, and third network paths containing at least one intermediate node;

correlating the first, second, and third delay times; and

providing a location estimate of the location of the Internet host according to the correlation of the first, second, and third delay times.

37. The method of claim 27, further comprising:

measuring a first delay time relating to a transmission from the first computer system to receipt of the transmission at the Internet host along a first network path between a host IP address associated with the Internet host and the first computer system;

measuring a second delay time relating to a transmission from a second computer system to receipt of the transmission at the Internet host along a second network path between the host IP address and the second computer system;

measuring a third delay time relating to a transmission from a third computer system to receipt of the transmission at the Internet host along a third network path between the host IP address and the third computer system, at least one of the first, second, and third network paths containing at least one intermediate node;

correlating the first, second, and third delay times; and

providing a location estimate of the location of the Internet host according to the correlation of the first, second, and third delay times.

38. A software tool for determining the location of an Internet host using a first computer system, comprising the following computer executable components:

a first component adapted to obtain partial IP-to-location mapping information from a data source;

a routing protocol component adapted to obtain network routing information;

a clustering component adapted to cluster together IP addresses corresponding to hosts in the same geographic location according to network routing information to obtain cluster information;

a correlation component adapted to correlate the partial IP-to-location information with the cluster information;

an estimation component adapted to provide a location estimate of the location of the Internet host according to the correlation of the partial IP-to-location information and the cluster information; and

a correction component to compute a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host and selectively providing the location estimate.

39. A computer-readable medium having computer-executable instructions for:

obtaining partial IP-to-location mapping information from a data source;

obtaining network routing information;

clustering together IP addresses corresponding to hosts in the same geographic location according to network routing information to obtain cluster information;

correlating the partial IP-to-location information with the cluster information;

providing a location estimate of the location of the Internet host according to the correlation of the partial IP-to-location information and the cluster information; and

calculating a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host and selectively providing the location estimate.

40. A computer implemented system for determining the location of an Internet host, comprising the following computer executable components:

a first component operating to obtain partial IP-to-location mapping information from a data source;

a second component operating to obtain network routing information;

a third component operating to cluster together IP addresses corresponding to hosts in the same geographic location according to network routing information to obtain cluster information;

a fourth component operating to correlate the partial IP-to-location information with the cluster information;

a fifth component operating to provide a location estimate of the location of the Internet host according to the correlation of the partial IP-to-location information and the cluster information; and

a sixth component operating to calculate a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host and selectively providing the location estimate.

41. Geographical location estimate data associated with an Internet host, the estimate data resulting from a process executing on a computer system, comprising the following computer executable acts:

obtaining partial IP-to-location mapping information from a data source;

obtaining network routing information;

clustering together IP addresses corresponding to hosts in the same geographic location according to network routing information to obtain cluster information;

correlating the partial IP-to-location information with the cluster information;

providing a location estimate of the location of the Internet host according to the correlation of the partial IP-to-location information and the cluster information; and computing a dispersion metric representative of the accuracy of the location estimate of the location of the Internet host and selectively providing the location estimate.

## IX. Evidence Appendix (37 C.F.R. §41.37(c)(1)(ix))

None.

## X. Related Proceedings Appendix (37 C.F.R. §41.37(c)(1)(x))

None.